BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 3: e38233
doi: 10.3897/biss.3.38233

OPEN ACCESS

Conference Abstract

Artificial Intelligence's Role in Global Camera Trap Data Management and Analytics via Wildlife Insights

David Thau[‡], Jorge A. Ahumada[§], Tanya Birch[|], Eric Fegraus[§], Nicole Flores[§], Walter Jetz[¶], Roland Kays[#], Margaret Kinnaird[¤], Sayali Kulkarni[«], Arnaud Lyet[»], Timothy G. O'Brien[ˆ], Jonathan Palmer[ˆ], Stephanie Schuttler[#], Michelle Duong[¶], Ruth Oliver[¶], Jennifer Y. Zhao[˅], William J. McShea[˅]

‡ WWF, San Francisco, United States of America
§ Conservation International, Arlington, United States of America
| Google Inc., Mountain View, United States of America
¶ Yale University, New Haven, United States of America
# North Carolina Museum of Natural Sciences, Raleigh, United States of America
¤ WWF International, Nairobi, Kenya
« Google Research, Mountain View, United States of America
» World Wildlife Fund, Washington D.C., United States of America
ˆ Wildlife Conservation Society, New York, United States of America
˅ Smithsonian Conservation Biology Institute, Front Royal, United States of America

Corresponding author: David Thau (dave.thau@wwfus.org)

Received: 12 Jul 2019 | Published: 17 Jul 2019

Citation: Thau D, Ahumada JA, Birch T, Fegraus E, Flores N, Jetz W, Kays R, Kinnaird M, Kulkarni S, Lyet A, O'Brien TG, Palmer J, Schuttler S, Duong M, Oliver R, Zhao JY, McShea WJ (2019) Artificial Intelligence's Role in Global Camera Trap Data Management and Analytics via Wildlife Insights. Biodiversity Information Science and Standards 3: e38233. https://doi.org/10.3897/biss.3.38233

Abstract

Camera traps have existed since the 1890s (Kucera and Barrett 2011), but they weren't widely used until the introduction of commercial infrared-triggered cameras in the early 1990s (Meek et al. 2014). Since then, millions, perhaps billions of camera trap images have been collected for many reasons, biodiversity monitoring being one of the key applications. Unfortunately, although there are camera trap deployments all over the world, these operations occur in isolation, limiting the impact they could have on a global understanding of biodiversity health. Even within individual institutions, managing and analyzing multiple camera trap deployments in aggregate can be challenging. In fact, managing a single deployment of camera traps is non-trivial and important data are frequently cast aside as bycatch, left unanalyzed on decaying hard drives.

© Thau D et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Wildlife Insights attempts to overcome these hurdles by providing camera trap data upload, management, and analysis services. It provides the world's largest database of camera trap images by bringing together the camera trapping efforts of several the world's largest conservation and research organizations, and it is open to future contributors. Artificial Intelligence-driven services sit at the heart of the platform. New camera trap data uploads are automatically analyzed to differentiate between images with people, non-human animals, and no animals. The images with non-human animals are further analyzed to detect specific species. The proposed labels are sent back to the submitter for review and then uploaded to the database. All uploaded images, unless specifically embargoed, are immediately available for analysis by all users of the system. A selection of tools are provided to support analyses of global biodiversity.

This presentation will describe Wildlife Insights and its AI implementation in detail, contextualized by case studies using analyses of the data currently stored on the platform. Challenges around integrating camera trap data within the platform and with other external services that work with the platform will also be discussed. The talk will end with some thoughts about future directions for the AI services, especially with regards to integration with related platforms.

Keywords

artificial intelligence, species identification, computer vision, big data

Presenting author

David Thau

Presented at

Biodiversity_Next 2019

References

- Kucera TE, Barrett RH (2011) A history of camera trapping. In: O'Connell A, Nichols J, Karanth KU (Eds) Camera traps in animal ecology. Springer, Tokyo.
- Meek P, Fleming P, Ballard G, Banks P, Claridge A, Sanderson J, Swann D (Eds) (2014) Camera trapping: Wildlife management and research. CSIRO Publishing, 392 pp.